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ABSTRACT

The major purpose of this study was to relate individual differences among selected Suffolk University freshmen to their ability to succeed academically through a reading study skills course which utilized a teacher-directed approach and a student-directed approach. The subject were 87 students from a freshman class who had graduated in the bottom 60th percent of their high school class. The students were randomly assigned to three groups: (1) a noncredit student-directed skills class, (2) a noncredit teacher-directed skills class, and (3) a control group receiving no training in reading study skills. There were two sections of each teaching approach, both sections taught by the investigator. Fifty-minute classes were held twice a week for 15 weeks. Students in both the experimental and control groups carried between 12 and 15 academic credit hours. An examination of the resultant tables shows that if alternative instructional treatments are provided for students with different characteristics, a greater proportion of students required to enroll in Suffolk University's College Reading-Study Skills program should make scholastic improvement. (TS)

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MATCHING COLLEGE READING INSTRUCTION
WITH STUDENT CHARACTERISTICS

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Matching College Reading Instruction
With Student Characteristics*

INTRODUCTION

In a recent article published in Reading World, this writer (Santeusanio, 1974) surveyed the effectiveness of College Reading-Study Skills (CRSS) programs. It was concluded that "the effectiveness of CRSS programs is not well established ... (but) CRSS programs would be more effective if instructors provided different teaching methods for different students. This idea is based on the premise that no single best way to teach anything to all people will ever be found (p.267.)."

The idea of matching students with appropriate teaching approaches or treatments was introduced by Cronbach (1967) who stated that "for any practical problem, there is some best group of treatments to use and some best allocation of persons to treatments ... ultimately we should design treatments not to fit the average person, but to fit groups of students with particular aptitude patterns [pp.680-681]." Cronbach and Snow(1969) define aptitude as any characteristic of the individual that changes his probability of success in a given treatment.

Cronbach (1967) suggested that experimental and correlational psychologists observe experimental effects for subjects of different characteristics and conduct investigations to find aptitude-treatment-interactions (ATI). Reading specialists such as Blanton (1971) and Yarrington and Boffy (1971) have recognized the need for ATI research in reading. According to Bracht(1970), the goal of research on ATI is "to find significant disordinal

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interactions between alternative treatments and personological variables, i.e., to develop alternative instructional programs so that optimal educational payoff is obtained when students are assigned differently to the alternative programs [p. 627]."

An idealized model of an ATI study is shown in figure one. A greater proportion of students attained the instructional objectives of a CRSS program when instruction was differentiated for different types of students. Students who scored high on aptitude X gained greater success with method A, while students who scored low on aptitude X attained greater success with method B.

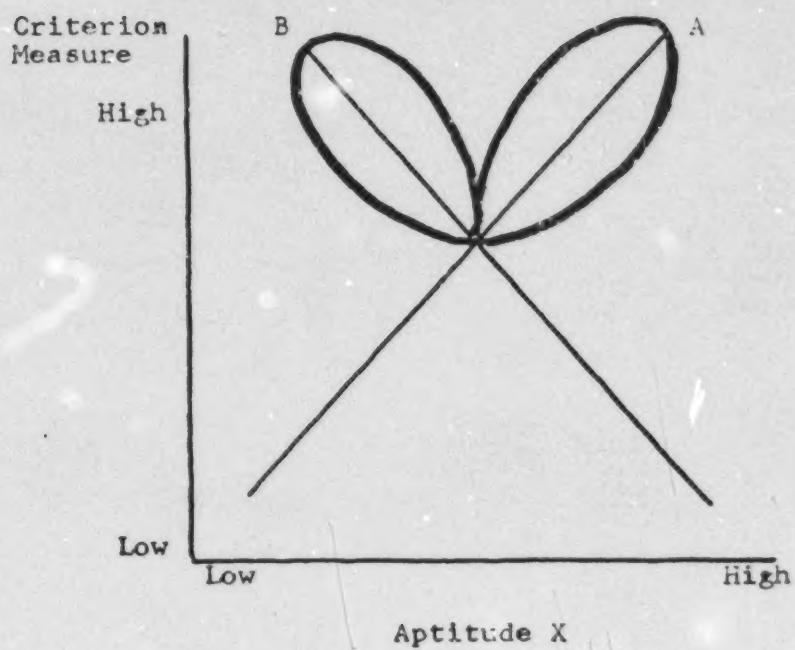
THE STUDY

Purpose

An ATI study on a CRSS program was conducted by the writer in the fall, 1971. The major purpose of the study was to relate individual differences among selected Suffolk University freshmen to their ability to succeed academically through a reading-study skills course which utilized (1) a teacher-directed approach and (2) a student-directed approach. The identification of isolated variables or student characteristics which differentially interacted with the two instructional strategies would thus make it possible for the reading instructor at Suffolk University to prescribe the appropriate instructional method for each freshman enrolled in the reading-study skills course. Stated differently, the discovery of significant interactions would make it possible to match freshman students with the most appropriate instructional approach to college reading instruction.

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Figure 1
Model of Aptitude-Treatment Interaction



Sample

The sample included 87 students from the 1971 freshman class of Suffolk University, Boston. These students scored below 475 on the verbal section of the Scholastic Aptitude Test and had graduated in the bottom 60th percent of their high school class. Subjects were randomly assigned to one of three groups: a non-credit teacher-directed reading-study skills class (26 students); a non-credit student-directed reading-study skills class (32 students); a control group receiving no training in reading-study skills (29 students). Those assigned to the reading-study skills classes were required to enroll in the course as a condition of admission to the University.

There were two sections of each teaching approach. The investigator taught each section. Fifty-minute classes were held twice a week for 15 weeks. Students in both the experimental and control groups carried between 12 and 15 academic credit hours.

Table 1 presents the analysis of variance summary of the three groups on the Scholastic Aptitude Test-Verbal Section and the vocabulary, comprehension, total, and reading rate sections of the Nelson-Denny Reading Test. It is clear that the groups were evenly matched on these variables. The significance of the differences was tested using a one-way analysis of variance technique.

Instructional ApproachesStudent-Directed Approach (SD)

The philosophy underlying this approach is that students, working individually within a group, have the ability to improve their own reading-study skills under a competent facilitator.

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TABLE 1

Analysis of Variance Summary.
Scholastic Aptitude Test-Verbal, Nelson-Denny Reading Test.
 Teacher-Directed, Student-Directed, Control (N=87)

Variable	TD Group (N=26)		SD Group (N=32)		Control (N=29)		F
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	
SAT-V	414.15	33.78	429.94	30.42	423.03	39.05	1.50
N-D, Vocab	33.19	10.45	34.87	8.11	35.38	6.98	0.48
N-D, Comp	38.38	7.79	39.78	7.61	39.97	6.92	0.40
N-D, Total	71.65	16.25	74.72	12.56	75.34	12.04	0.57
N-D, Rate	271.69	92.60	283.94	81.18	278.52	69.92	0.16

*p<.05

**p<.01

The teacher does not actively teach in a formal sense; his role is to aid students when they have difficulty and to confer periodically with them regarding their progress.

Each student plans his own reading program based on the results of diagnostic testing and/or his own felt needs. Brunner (1961) referred to this approach as teaching that takes place in the "hypothetical" mode when

the teacher and student are in a more cooperative position with respect to what in linguistics would be called 'speaker's decisions.' The student is not a bench-bound listener, but is taking a part in the formulation and at times may play the principal role in it [p. 23].

Carter and McGinnis (1953) set forth some principles of the student-directed approach.

1. Every student should know how well he reads and should select for himself the specific reading abilities he needs to acquire.
2. The student must understand that he can improve his reading ability and that the responsibility for doing so rests with him.
3. Each student should be given the opportunity to set up his own reading objectives and to attain them at his own rate in accordance with his plans [p. 47].

Teacher-Directed Approach (TD)

The TD approach is basically a traditional lecture-discussion format. The philosophy of this method is that the instructor is the authority whose task is to convey information about reading-study skills to students so that they may master and apply them. The teacher is the classroom's most active member, carefully directing and controlling the learning situation. He lectures,

demonstrates, elicits discussion, and plans a sequential instructional program.

Brunner (1961) referred to this approach as teaching that takes place in the "expository" mode.

...the decisions concerning the mode and pace and style of exposition are principally determined by the teacher as expositor; the student is the listener. If I can put the matter in terms of structural linguistics, the speaker has a quite different set of decisions to make than the listener; the former has a wide choice of alternatives for structuring, he is anticipating paragraph content while the listener is still intent on the words, he is manipulating the content of the material by various transformations, while the listener is quite unaware of these internal manipulations [p.23].

Cantor (1953) suggested some assumptions about "orthodox" teaching that are applicable to the TD approach. Two such assumptions are:

1. The teacher's responsibility is to set out what is to be learned and the student's responsibility is to learn it;
2. The pupil's acquisition of knowledge is the responsibility of the teacher.

Several studies (Spache, Standlee, and Neville, 1960; Maxwell and Magoo, 1962; Veale, 1967; Phillips, 1972) of SD vs. TD approaches to CRSS programs have been inconclusive. This could be due to factors such as curriculum studied by the student, length of the course, personality differences between students, and competence of instruction. Perhaps the major explanation is the investigator's choice of research design and statistical analysis. Lesser (1971) pointed out the limitations of these choices..

Most research on individual methods has ignored the implications of individual differences, assigning subjects randomly to two or more instructional conditions, comparing average performance on some criterion, and reporting either that there are no significant differences or that one method is more effective than the other in some general sense. This research approach has not had a fruitful history. Among other faults, averaging scores and comparing means obscure the different effects that any one method has on students with different aptitudes and motivations (McKeachie, 1961). Almost all the evidence on comparing the effectiveness of different teaching methods applies to the average student; and thus to no one student at all (Snow and Salomon, 1968).

Pitting one instructional method against another has been called 'horse race' evaluation (Messick, 1967). In contrast to 'horse race' evaluation of instruction, our premise is that no single, best way to teach anything to all people will ever be found. Instead of searching for such general, simple solutions, it is our contention that we should be pursuing the more fundamental search for different methods suitable to different students for achieving both universal and particular goals. [pp. 533-534].

Research Technique

Regression slopes obtained between the criterion measures and each of the student characteristic measures (aptitudes) under each treatment were tested by a parallelism of regression test (Parlreg --- Statistical Reference --- Dixon and Massey, 1957, p. 218, Equation 2A). This test was created at the Stanford University Center for Research and Development of Teaching and converted and improved at the University of Massachusetts by David Coffing to determine the extent to which each treatment differed. Homogeneity of variance was assumed before the regression slopes were obtained.

Measures of Student Characteristics (Aptitudes)

Several measures of student characteristics were chosen for one of the following reasons:

1. The measure had demonstrated its usefulness as a predictor of academic success or improvement in a CRSS course;
2. The measure had interacted significantly with treatments similar to those being investigated in this study;
3. In the opinion of the writer, the measure appeared to have the potential to interact significantly with the treatments.

Measurement # 1 - Taylor Manifest Anxiety Scale (1953)

The Taylor Manifest Anxiety Scale consists of 28 items to be answered true or false. It was constructed by five clinical psychologists who chose from the Minnesota Multiphasic Personality Inventory statements that they regarded as overt admissions of anxiety. A test-retest reliability of .88 was reported. Scores were obtained from 179 students in an introductory psychology course after an intertest interval of four weeks.

Measurement #2 - James Internal-External Scale (1957)

The James Internal-External Scale is a 60-item questionnaire designed to measure an individual's general tendency to view events as being internally or externally controlled. Internally-oriented students perceive events in their environment as being a consequence of their own action and thereby under personal control. Externally-oriented students perceive events in their environment as a consequence of the actions of others and therefore beyond personal control. No validity or reliability data is available on the test.

Measurement #3 - Preferred Instructor Characteristics Scale (1957)

The Preferred Instructor Characteristics Scale (PICS) was

designed by Krumholtz and Farquhar and is purported to measure student preference for an "affective" instructor or a "cognitive" instructor. The authors defined the cognitive instructor as one concerned with the intellectual, abstract, subject-matter goals of teaching and the affective instructor as being concerned with emotional adjustment and student interactions in the classroom. To obtain some degree of face validity, the authors submitted the statements on the PICS to three advanced graduate students in educational psychology and one instructor in humanities to separate the items according to whether they were "affective" or "cognitive." Statements which were unanimously classified by all four judges plus the two authors were retained for the scale. In its final form, the scale included six cognitive and six affective items.. The authors reported a test-retest reliability coefficient of .88 and an internal consistency reliability coefficient of .90.

Criterion Measures

Overall grade point average (GPA) for fall and spring semester and GPA in verbal subjects only for fall and spring semester were used as criterion measures. Overall GPA was selected because the major purpose of most CRSS programs is to produce improvement in the scholastic standing of students (Pauk, 1965). Verbal GPA was selected as a criterion measure because the majority of CRSS programs stress English and social studies reading and place minimal emphasis on reading skills required in science and mathematics (Wright, 1962).

Results

Table 2 presents the obtained F. Ratios.. There were

significant non-parallel regression slopes in relation to one or more of the criterion measures for each student characteristic measure.

An analysis of Figure 2 indicates non-parallel regression slopes at the .05 level of significance for the Taylor Manifest Anxiety Scale in relation to the fall overall GPA. For high-scoring students (students characterized as highly anxious), learning was facilitated more by student-directed instruction and for low-scoring students (students characterized as low-anxious), learning was facilitated more by teacher-directed instruction.

An analysis of Figure 3 indicates non-parallel regression slopes at the .05 level of significance for the James Internal-External Scale scores in relation to the Spring overall GPA criterion. The more externally oriented a student (a student characterized as seeing events beyond his personal control), the more his learning was facilitated by student-directed instruction and the more internally oriented a student (a student characterized as seeing events under his personal control), the more his learning was facilitated by teacher-directed instruction.

An analysis of Figures 4 and 5 indicates that there were significant non-parallel regression slopes at the .05 level of significance for the Preferred Instructor Characteristics Scale in relation to the fall verbal GPA and spring verbal GPA criterion measures. With fall verbal GPA as the criterion, the interaction was disordinal, but major treatment differences were related only to low scores (preferences for an affective instructor); the lower a student scored, the more his learning was facilitated by teacher-

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TABLE 2

Test of Parallelism of Regression Results
between Predictor Variables and the Four Criterion Measures
for the Total Experimental Population (N=58).

Predictor Variables	Criterion Measures			
	Parallelism F Ratio			
	FOGPA	FVGPA	SOGPA	SVGPA
James Internal-External Scale	3.08	.40	6.50*	2.93
Taylor Manifest Anxiety Scale	4.05*	3.02	.00	1.33
Preferred Instructor Characteristics Scale	2.01	6.37*	2.08	5.36*

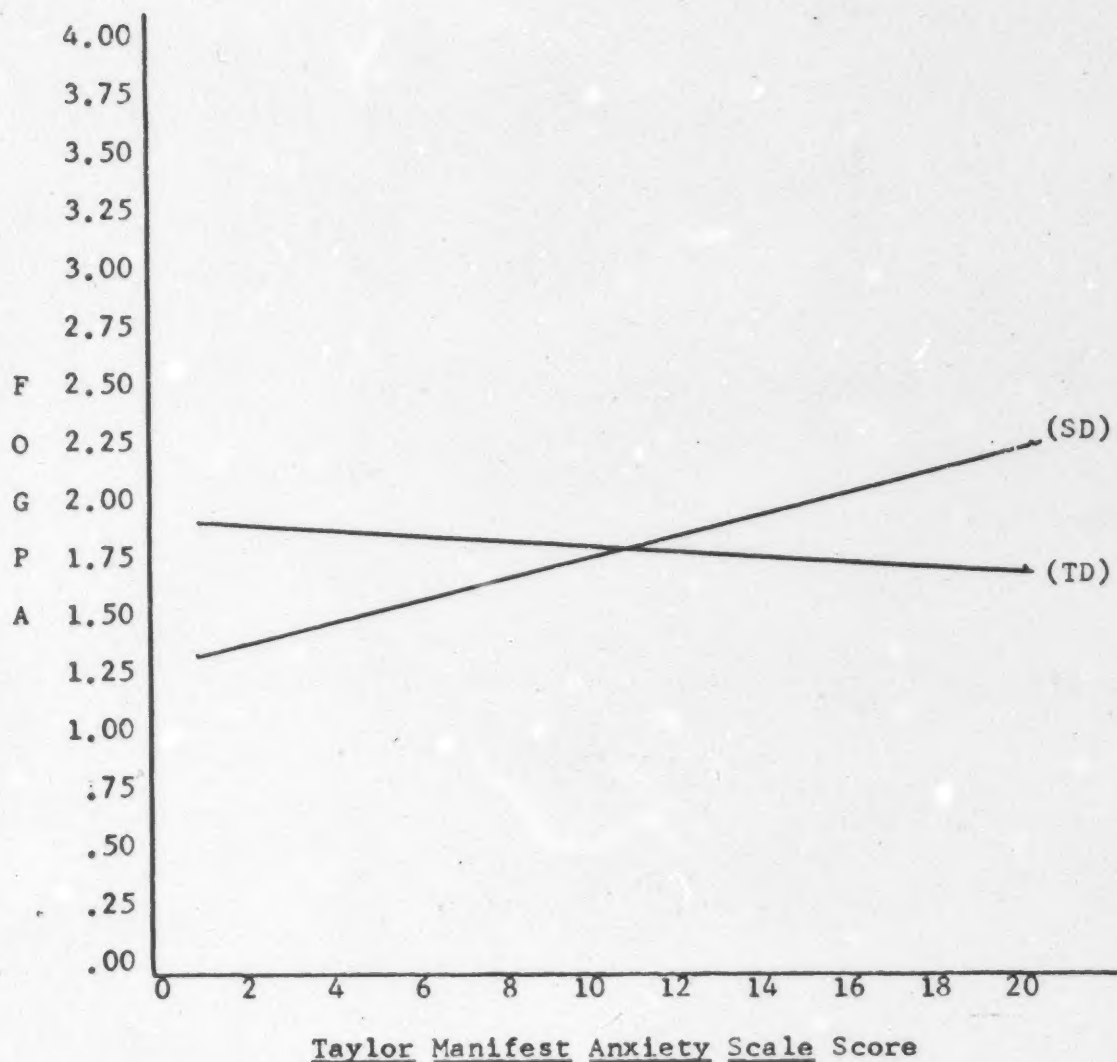
*p .05

**p .01

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Figure 2

Significant Regression Slopes with
Taylor Manifest Anxiety Scale as Predictor
 and Fall Overall GPA as Criterion Measure.
 Student-Directed (N=32) vs. Teacher-Directed (N=26)

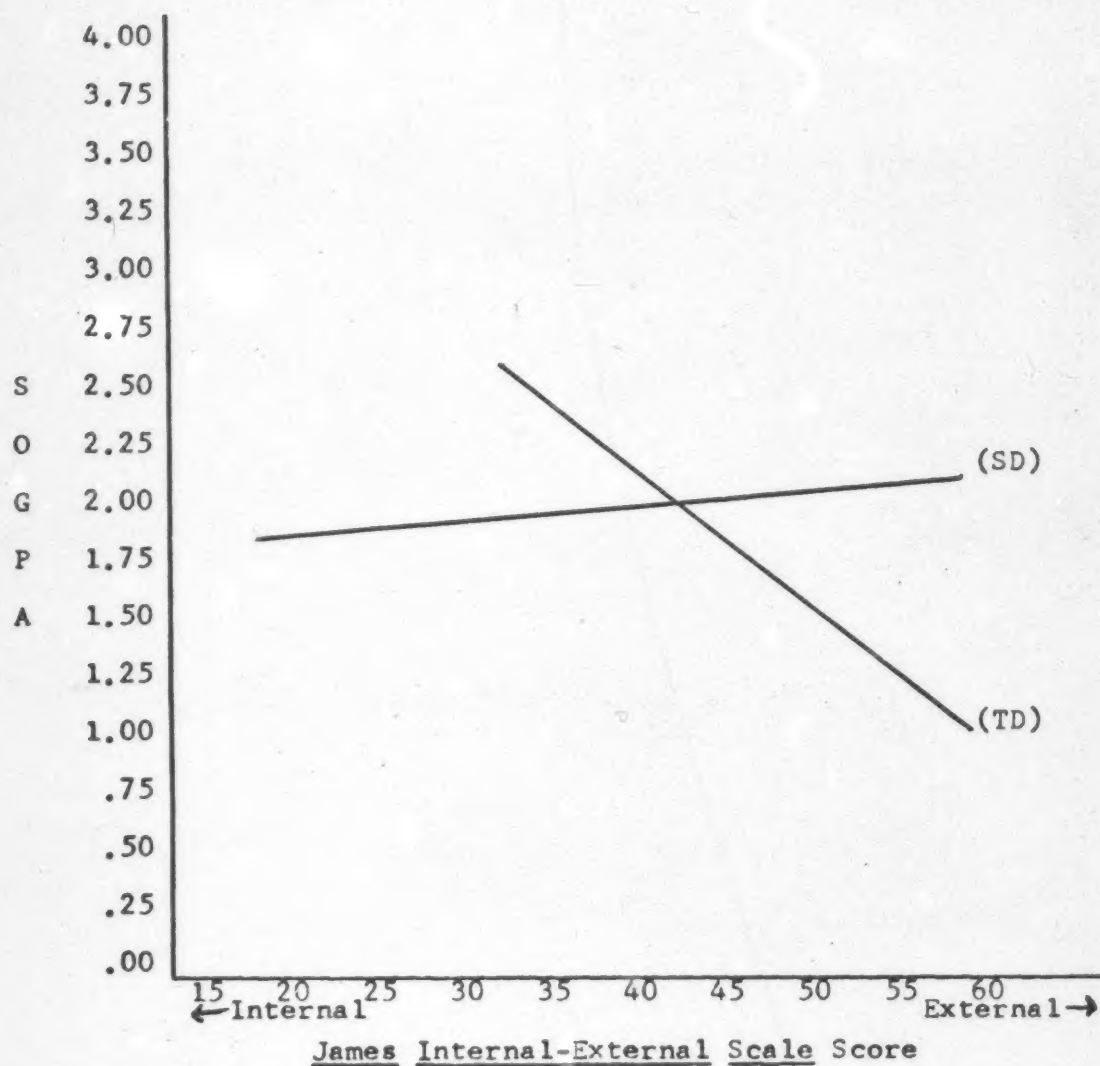


The end-points of the regression lines indicate the extreme scores on the aptitude variables for each treatment group.

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Figure 3

Significant Regression Slopes with
James Internal-External Scale as Predictor
 and Spring Overall GPA as Criterion Measure.
 Student-Directed (N=32) vs. Teacher-Directed (N=26)

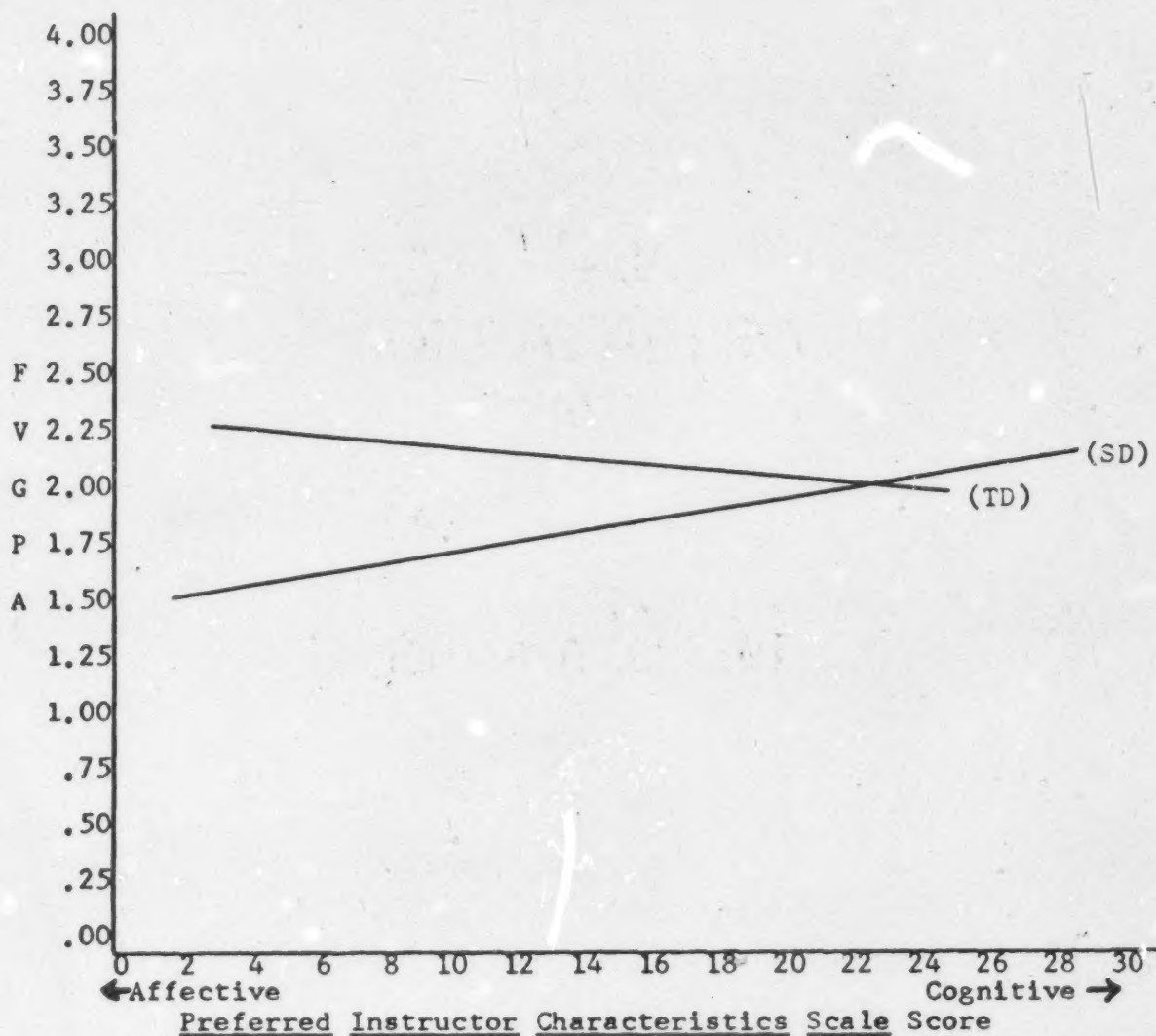


The end-points of the regression lines indicate the extreme scores on the aptitude variables for each treatment group.

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Figure 4

Significant Regression Slopes with
Preferred Instructor Characteristics Scale as Predictor
 and Fall Verbal GPA as Criterion Measure.
 Student-Directed (N=32) vs. Teacher-Directed (N=26)

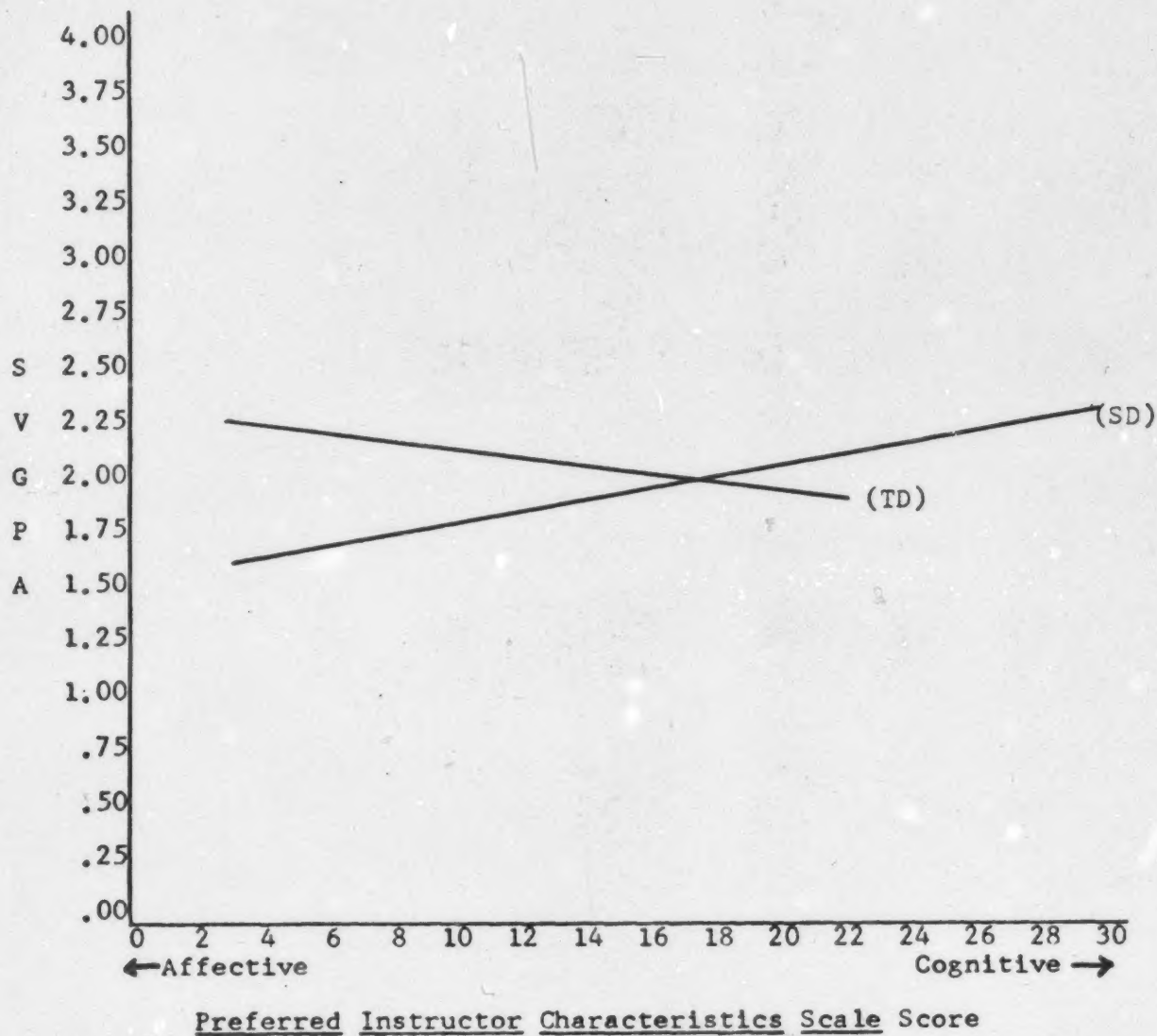


The end-points of the regression lines indicate the extreme scores on the aptitude variables for each treatment group.

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Figure 5

Significant Regression Slopes with
Preferred Instructor Characteristics Scale as Predictor
 and Spring Verbal GPA as Criterion Measure.
 Student-Directed (N=32) vs. Teacher-Directed (N=26)



The end-points of the regression lines indicate the extreme scores on the aptitude variables for each treatment group.

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directed instruction and less by student-directed instruction. On the spring verbal GPA criterion, there is a substantial disordinal interaction. The more a student preferred a cognitive type instructor (student characterized as preferring instructors with intellectual, abstract, subject-matter goals), the more his learning was facilitated by student-directed instruction and the more a student preferred an affective instructor (student characterized as preferring teachers concerned with emotional adjustment and student interaction), the more his learning was facilitated by teacher-directed instruction.

DISCUSSION

An explanation of the ATI found for the Taylor Manifest Anxiety Scale may be that high anxious students felt more comfortable in a student-directed approach because there was no "pressure" to perform for teacher and peers and because students were allowed to progress at their own pace. Students in the SD approach worked independently on self-directing, self-correcting materials and occasionally conferred with the instructor regarding their progress. On the other hand, the low anxious students probably felt comfortable in an environment in which they were encouraged to address questions to either another student or the instructor. Student responses and interaction were encouraged and the instructor built upon student-initiated responses.

An explanation of the ATI found for the James Internal-External Scale may concern the nature of the instructional materials and the role of the instructor. Students in the SD group had a

large variety of self-directing, self-correcting and programmed material from which to choose. Although such materials allow a student to proceed at his own rate, they are highly structured and carefully worked out in advance by the author in a step-by-step progression with "correct" responses provided by the author. Students may have perceived such an environment as "external" in that the program is beyond their personal control with regard to the program's sequence and the interpretation and justification of "correct" responses.

On the other hand, textbooks, skills, and exercises in the TD group were chosen by the instructor, but varied responses to questions were accepted and students were encouraged to support their own alternative answers and interpretations. Students may have perceived that the interpretation and justification of "correct" responses were internally controlled or within their personal control.

An explanation of the ATI's found in the Preferred Instructor Characteristics Scale may concern the role of the instructor in each treatment group. The instructor in the TD treatment encouraged student interaction and he attempted to establish a comfortable, friendly classroom atmosphere (affective instructor). In the SD treatment the instructor did not encourage students to interact and he attempted to establish a task-oriented atmosphere. Teacher-student conferences usually dealt solely with the student's progress and his questions on the subject matter (cognitive instructor).

CONCLUSIONS

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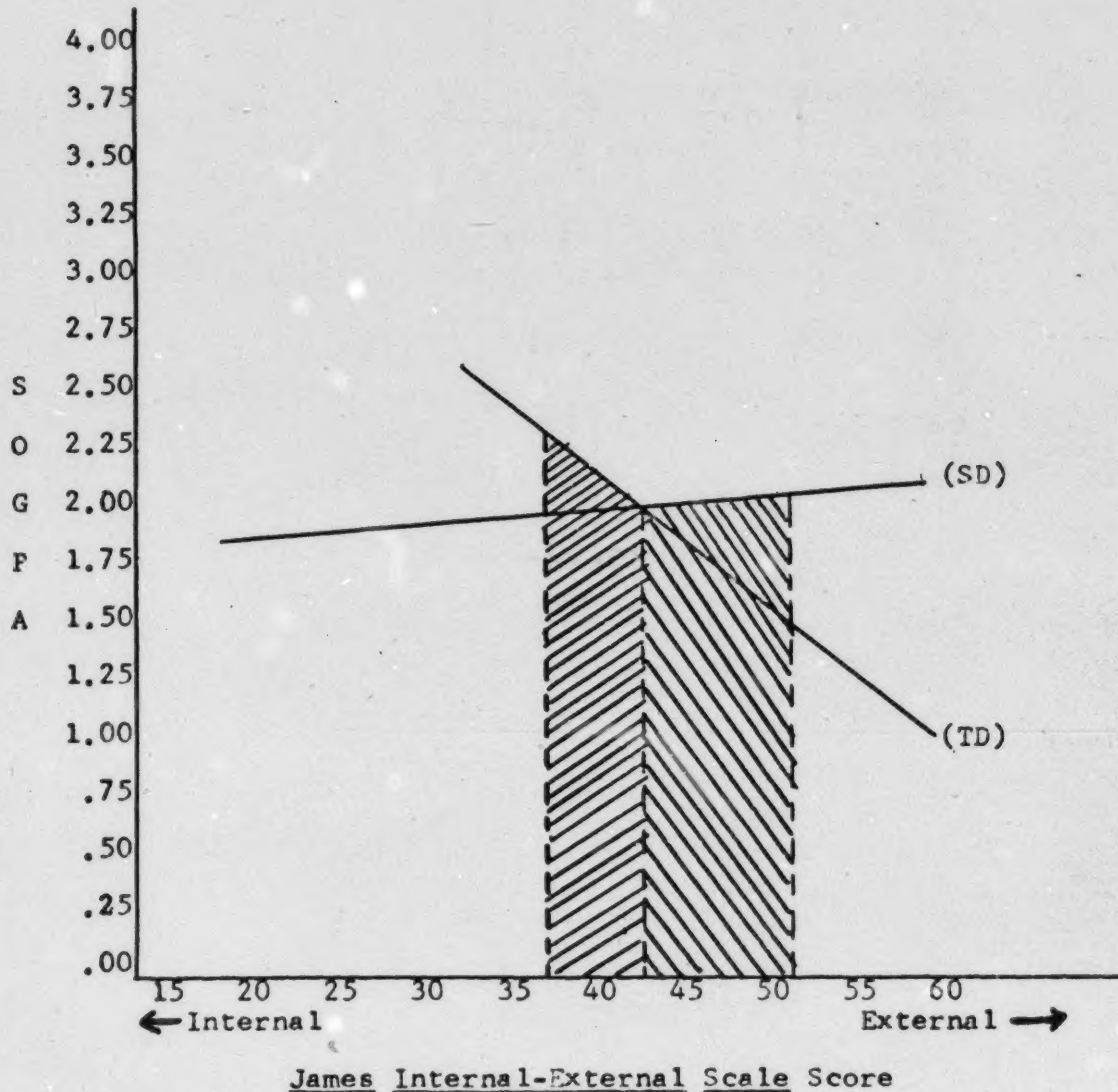
The major conclusion of this study is that if alternative instructional treatments are provided for students with different characteristics (aptitudes), a greater proportion of students required to enroll in Suffolk University's CRSS program should make scholastic improvement.

Before predictions can be made about precisely which students should be placed in alternative CRSS treatment groups, this study should be replicated using a larger sample and employing the Johnson-Neyman technique (Johnson and Neyman, 1936). This technique defines the regions or scores in which the treatments are significantly different. A hypothetical example is presented in Figure 6 with the James Internal-External Scale as the predictor and the spring overall GPA as the criterion. In predicting the optimum treatment, those students scoring below 37 on the scale should be assigned to the TD treatment and those students scoring above 51 should be assigned to the SD treatment. Both treatments produce the same results for students whose scores fall between 37 and 51; therefore, for those students this particular scale could not be used to differentially predict an optimal treatment.

Figure 6

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A Hypothetical Example of the Johnson-Neyman Technique
 with James Internal-External Scale as Predictor
 and Spring Overall GPA as Criterion Measure.
 Student-Directed (N=32) vs. Teacher-Directed (N=26)



The length of the line indicates the range of scores
 for each treatment.

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